

CLAIMS

I claim:

1. A method for improving the performance of an electrokinetic pump, comprising: adding a chemical
5 compound to a pump fluid to increase the permittivity of the pump fluid, wherein the added chemical compound is substantially charge neutral and has a dipole moment.
2. The method of claim 1, wherein the chemical compound has a dipole moment of at least about 10 D.
- 10 3. The method of claim 1, wherein the chemical compound is a zwitterion.
4. The method of claim 3, wherein the zwitterion contains one or more positive charges from the group including primary amine, secondary amine, tertiary
15 amine, or quaternary amine and one or more negative charges from the group including sulfonate, phosphate, carbonate, or carboxylate.
5. The method of claim 3, wherein the zwitterion is a trialkyl ammonium alkane sulfonate, an alkyl imidazole
20 alkane sulfonate, or an alkyl pyridine alkane sulfonate.
6. The method of claim 5, wherein the zwitterion is trimethyl ammonium propane sulfonate.
7. The method of claim 1, wherein the pump fluid is an aqueous mixture.
- 25 8. An improved electrokinetic pump having
 - a) a microchannel with an inlet and an outlet and a porous dielectric material disposed therebetween,

b) an electrolyte in communication with the porous dielectric material, and

c) spaced electrodes in contact with said electrolyte, wherein the improvement comprises adding a chemical compound to said electrolyte to increase the permittivity of said electrolyte, wherein the added chemical compound is substantially charge neutral and has a dipole moment, and wherein the additive produces a positive dielectric increment in said electrolyte.

9. The electrokinetic pump of claim 8, wherein the chemical compound has a dipole moment of at least about 10 D.

10. The electrokinetic pump claim 8, wherein the chemical compound is a zwitterion.

11. The electrokinetic pump of claim 10, wherein the zwitterion contains one or more positive charges from the group including primary amine, secondary amine, tertiary amine, or quaternary amine and one or more negative charges from the group including sulfonate, phosphate, carbonate, or carboxylate.

12. The electrokinetic pump of claim 8, wherein the zwitterion is a trialkyl ammonium alkane sulfonate, an alkyl imidazole alkane sulfonate, or an alkyl pyridine alkane sulfonate.

13. The electrokinetic pump of claim 12, wherein the zwitterion is trimethyl ammonium propane sulfonate.

14. The electrokinetic pump of claim 8, wherein the

electrolyte is an aqueous mixture.

15. An electrolyte for an electrokinetic pump,
comprising: a fluid having a chemical compound dissolved
therein, wherein the chemical compound is a zwitterion
5 that is substantially charge neutral and has a dipole
moment, and wherein the chemical compound produces a
positive dielectric increment in said electrolyte.

16. The electrolyte of claim 15, wherein the chemical
compound has a dipole moment of at least about 10 D.

10 17. The electrolyte of claim 15, wherein the zwitterion
contains one or more positive charges from the group
including primary amine, secondary amine, tertiary
amine, or quaternary amine and one or more negative
charges from the group including sulfonate, phosphate,
15 carbonate, or carboxylate.

18. The electrolyte of claim 15, wherein the zwitterion
is a trialkyl ammonium alkane sulfonate, an alkyl
imidazole alkane sulfonate, or an alkyl pyridine alkane
sulfonate.

20 19. The electrolyte of claim 18, wherein the zwitterion
is trimethyl ammonium propane sulfonate.

20. The electrolyte of claim 15, wherein the fluid is
an aqueous mixture.